How to Master the Times Tables

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Here is an easy solution to what has become a major problem among homeschoolers.

Problem: Can't memorize the times tables.
Solution: Don't blindly memorize; teach meaning instead.

This article explains how to teach meaning. Meaning stays with children for life; blind memorizing does not last long without constant review. Meaning fascinates and engages the mind; blind memorizing bores the mind.

Begin the meaning route by giving children a good mental picture of our number system. Make a hundred chart for this.[*] This is a chart of squares, ten by ten. In the top row of squares print the numbers 1 to 10. In the second row print the numbers 11 to 20, and so on to 100 in the bottom row. Children could make this chart as a large poster.

Now, forget for a while that you're on multiplication. Just work at first to build understanding of the number system. Have your child point on the chart with his finger or a short pointer everything you ask him to do. First show that adding is nothing more than counting forward.

• Point to 4. Add 3 squares. Where do you land?
• Point to 14. Add 3 squares. Where do you land?
• Point to 54. Add 3 squares. Where do you land?

Repeat with similar examples a few times each day. These examples each remain on one row in the chart. Stay at that level until you see that the child sees clearly that adding counts forward in the numbers. Then switch to subtraction, or take-away if your book uses that term. Subtraction is simply counting backward. Remember to have the child always point off squares on the hundred chart. This builds his inner visualization of the number system and that's what you're after here, not simply answers.

When the above addition and subtraction problems are mastered, pose some problems that move from one row to the next. This is called bridging, bridging from one decade to the next.

• Point to 8. Add 6.
• Point to 18. Add 6.
• Point to 38. Add 6.

Later you can mix up the problems and not stay with one pattern like adding 6. When your child masters moving down the rows, begin counting by fives. Make him point, always point as he counts and says "5, 10, 15, 20, 25" and so on through the chart. Then:

• Count by 2s. (Every count is an even number.)
• Count by 10s.

Counting by fives, twos, and tens is relatively easy compared with other counting jumps. But if your child can do it, try counting by fours. That's twice the jumps of 2. If he does this enough he may catch on that in one row the counts end with 4 and 8, and in the next row the counts end with 2, 6, and 0. Then it's back to 4 and 8 again. That two-row pattern continues all the way to 100. Your child should be seeing patterns everywhere by now. That's part of the understanding he's building.

When all the above is extremely easy for your child, try doing multiplication problems, still having him point out everything on the chart. Count by twos as above. Then:

- Show me two 2s. Where do you land? (Points to 2 and 4.)
- Show me three 2s. (Points to 2, 4 and 6.)
- Show me four 2s. (2, 4, 6, 8)
- Continue to ten 2s.

When the child does this well, have him write 2 x 2 = 4 horizontally, or vertically if that's the way his book does it. Then write 3 x 2 = 6 and the others all the way to 10 x 2. He should refer to the chart when needed. This is not a memory assignment or memory test. He's learning to visualize the number system any time he refers to the chart.

Count by fives to 50. Then:

- Show me two 5s. (5, 10)
- Show me three 5s. (5, 10, 15)
- Continue up to ten 5s.

Try teaching what is called the law of commutation: Show me two fives. Now show me five twos. Oh, the same answer both ways. Write both on your paper.

Another example: show me three fives. Now show me five threes. Oh, it's 15 both ways. Write both on your paper. Either way you turn the numbers, the answer is 15.

Write the table of fives in a list from 2 x 5 = 10 all the way to 10 x 5. Beside it write a list that commutes the numbers, beginning with 5 x 2 and 5 x 3 all the way to 5 x 10. Do similar double lists with the twos and with the tens.

By this stage a child will know quite a few multiplication facts and he hasn't spent any time with straight, boring memory. He spent his time thinking and understanding what goes on with the numbers. Now when he gets to larger numbers that he can't visualize easily, he at least understands what happens when he multiplies them.

Some larger multiplication facts are easy if you relate them to already known facts. For example, teach the table of nines by relating it to the tens. What is 9 x 6? First think that 10 x 6 is 60, so subtract one 6 and get 54. Another example: What is 9 x 4? First think ten fours is 40, so subtract

one 4 and get 36. Try a few each day until the nines are easy. Remember to commute when it helps. If a problem is 8 x 9, turn it to 9 x 8 and proceed by relating to 10 x 8.

After the nines are mastered, use the same system with the sixes. Relate each to the fives. For 6 x 4, think 5 x 4 plus another 4. For 6 x 7, think 5 x 7 plus another 7. Adding that 7 requires bridging, so those early steps of addition are necessary now for multiplication. To add 7 to 35, most people probably visualize that 5 takes them up to 40, then 2 more makes 42. If your child has trouble with this, go back to practice bridging on the chart. That's adding a number that requires moving from one row to the next.

Children who catch on easily to the meaning system will figure out more meaning for themselves and you don't have to teach everything. For children who don't catch on, go back to the early stages and teach again, moving slowly.

After a child masters the practices described above, he could fill out a sheet (don't call it a test) that has all the multiplication facts. Don't push for speed, and tell the child he can skip ones he does not know. By this time there should be only a few he skips, if any. He can learn those few by relating them to nearby facts. Or he can memorize them. It will be a small memory task, nothing like if you had started by saying, "Now you must memorize the times tables," and you drilled and drilled each day. Children taught only by memory may have no way to figure out a fact they forget. Children taught by meaning can always find an answer some way or other.

It used to be important to achieve high speed in multiplying, but in our calculator age, speed does not matter in life applications. Use your judgment on how much speed to aim for.

For children near the early stages of multiplication, use the suggestions in this article in order and slowly and thoroughly. For children further along in their arithmetic book who bump into multiplication problems, use a part or parts that will iron out those problems. Careful teaching in basic arithmetic carries through life and helps immensely with all higher math.

[*]A large colored chart comes with *The Three R's* book by Beechick. (MottMedia.com, Amazon.com and many homeschool suppliers.)

Biographical Information

Dr. Ruth Beechick *is a curriculum and teaching specialist, and she has written several books for homeschoolers with guidance for teaching arithmetic as well as other subjects. See MottMedia.com, bhpublishinggroup.com or Amazon and other suppliers.*